

Acoustic Rapid COTS Insertion AN/BQQ-10(V) Sonar System

The Acoustic Rapid Commercial Off-the-Shelf (COTS) Insertion (A-RCI) AN/BQQ-10(V) Sonar System was initiated as Engineering Change 1000 to the AN/BSY-1 Combat System on improved *Los Angeles* class submarines. The concept uses installed legacy sensors and replaces central processors with COTS personal computer technology and software installed in an open architecture. A-RCI allows for faster, more economical, and more frequent hardware and/or software upgrades. The program expanded to provide improvements that could be back-fit into all nuclear attack (SSN) and ballistic missile (SSBN) submarines totaling over 60 ship sets. The system is now known formally as the AN/BQQ-10 (V) Sonar.

These improvements provide expanded capabilities, particularly in littoral waters, for covert intelligence collection and surveillance and covert insertion and support of Special Forces. Expanded capabilities for anti-submarine warfare focused on diesel-electric submarines, covert mining, and covert strike of targets ashore. Specific software improvements include passive ranging, spatial vernier processing, full spectrum processing, dual towed array concurrent processing, low frequency active interference rejection, passive broadband, passive narrowband and passive detection and tracking processing, track management, on-board training, and port/starboard ambiguity resolution.

The operational test and evaluation plan for A-RCI features four phases followed by periodic testing as evolutionary upgrades are made to the hardware and/or software. A-RCI Phase I added initial improvements to the towed array processing and added the TB-29 towed array.

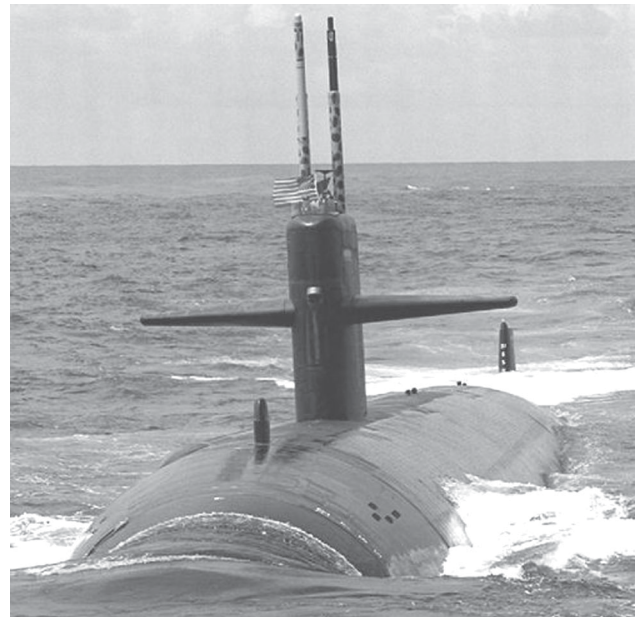
Phase II was the first implementation of the towed array improvements. When DOT&E placed the program under oversight in 2001, Phase II testing was already underway. The Navy provided insufficient submarine test resources for Phase II resulting in the deployment of Phase II equipped ships without operational testing. The importance of the program and the lack of adequate operational testing led to DOT&E putting this Acquisition Category IV program on oversight. Phase II testing was never completed due to repeatedly cancelled tests and equipment failures. Software reliability and configuration management problems continued to slow the program. In April 2001, Operational Test and Evaluation Force (OPTEVFOR) terminated the program testing until the system could be re-certified for testing.

Phase III is a major replacement of the sonar processing hardware and software for the towed, hull, and spherical arrays. The Navy certified Phase III for testing in March 2002.

Phase IV is an upgrade to the high frequency (HF) mine hunting and ice avoidance sonar. The Navy certified Phase IV for testing in August 2002. HF sonar data was collected against the Australian submarine, HMAS *Sheean*, and in a minefield test in the Berry Islands in August 2002.

TEST & EVALUATION ACTIVITY

Following re-certification, test and evaluation activity in FY03 centered on the completion of the operational evaluation (OPEVAL) of Phase III and Phase IV (begun in 2002). A-RCI Phase III OPEVAL testing completed in September 2003. Real world operations, system failures, and TB29/29A array failures required six separate attempts to complete the planned ten-day test plan. A-RCI Phase IV OPEVAL ended in February 2003.



The AN/BQQ-10 (V) Sonar is a major product improvement that will go on all submarine classes.

NAVY PROGRAMS

TEST & EVALUATION ASSESSMENT

OPTEVFOR is evaluating A-RCI Phase III OPEVAL data. DOT&E's initial assessment is that A-RCI Phase III does not meet all requirements and continues to have maintenance and reliability problems, but is an improvement over legacy systems.

OPTEVFOR evaluated A-RCI Phase IV as ineffective and unsuitable because the system failed to meet performance requirements. Despite not meeting requirements, DOT&E assesses Phase IV as an improvement over legacy HF systems.

The procurement and deployment of Phase II and III systems continued in 2003, even though the Director cited the A-RCI program in a letter to the Secretary of the Navy in August 2002. Navy leadership should support OPTEVFOR to ensure that the resources (test submarines and time) are available for the adequate operational test and evaluation of A-RCI before ships are deployed with these systems.